

What is claimed is:

1. Temperature compensation apparatus for thermally loaded bodies made from materials of low specific thermal conductivity, wherein a heat-distributing device having one or more heat-distributing bodies is adapted to surfaces of the thermally loaded body such that there remains between the thermally loaded body and the heat-distributing bodies a gap which is filled with a fluid for the purpose of the thermal coupling of thermally loaded bodies and heat-distributing bodies in conjunction with mechanical decoupling.
2. Temperature compensation apparatus as claimed in claim 1, wherein the fluid-filled gap is connected to a pressure-compensating device via a connection.
3. Temperature compensation apparatus as claimed in claim 1, wherein the heat-distributing bodies are solid and are made from a material of high specific thermal conductivity, the specific thermal conductivity being substantially higher than, in particular at least ten times as high as that of the material of which the thermally loaded bodies consist.
4. Temperature compensation apparatus as claimed in claim 1, wherein at least one of the heat-distributing bodies is designed as a hollow body whose inner volume is filled with a fluid which executes a circulating flowing motion.
5. Temperature compensation apparatus as claimed in claim 1, wherein at least one of the heat-distributing bodies is connected via a supporting body to an external bearing structure, and is held

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by the latter, while there is no connection, or only a connection of very low stiffness (elastic connection) between thermally loaded body and heat-distributing bodies, as well as between thermally loaded bodies and supporting bodies.

6. Temperature compensation apparatus as claimed in claim 1, wherein the heat-distributing bodies are adapted to internal surfaces of the thermally loaded body.
7. Temperature compensation apparatus as claimed in claim 1, wherein the fluid-filled gap is connected to a sealable filling device via a connection (connecting channel).
8. Temperature compensation apparatus as claimed in claim 4, wherein for the purpose of generating the circulating flowing motion of the fluid, which fills the heat-distributing body designed as a hollow body, a recirculating device is connected to inlet and outlet openings of the heat-distributing body which are provided for this purpose.
9. Temperature compensation apparatus as claimed in claim 1, wherein at least one heat-distributing body is connected to one or more heat exchange elements of a temperature controller.
10. Temperature compensation apparatus as claimed in claim 9, wherein the heat exchange element is formed by a Peltier element.
11. Temperature compensation apparatus as claimed in claim 8, wherein a temperature controller of the flowing fluid is inserted into the circuit of this fluid.

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12. Temperature compensation apparatus for reflecting layer supports or substrates in optics, wherein a heat-distributing device having one or more heat-distributing bodies is adapted to surfaces of a thermally loaded body such that there remains between the thermally loaded body and the heat-distributing bodies a gap which is filled with a fluid for the purpose of thermal coupling of said thermally loaded bodies and said heat-distributing bodies in conjunction with mechanical decoupling.
13. Temperature compensation apparatus as claimed in claim 12, wherein the fluid-filled gap is connected to a pressure-compensating device via a connection, i.e. a volume-compensating channel.
14. Temperature compensation apparatus as claimed in claim 12, wherein the heat-distributing bodies are solid and are made from a material of high specific thermal conductivity, the specific thermal conductivity being substantially higher than, in particular at least ten times as high as that of the material of which the thermally loaded bodies consist.
15. Temperature compensation apparatus as claimed in claim 12, wherein at least one of the heat-distributing bodies is designed as a hollow body whose inner volume is filled with a fluid which executes a circulation.
16. Temperature compensation apparatus as claimed in claim 12, wherein at least one of the heat-distributing bodies is connected via a supporting body to an external bearing structure, and is held by the latter, while there is no connection, or only a connection of very low stiffness between

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thermally loaded body and heat-distributing bodies, as well as between said thermally loaded bodies and said supporting bodies.

17. Temperature compensation apparatus as claimed in claim 12, wherein the heat-distributing bodies are adapted to internal surfaces of the thermally loaded body.
18. Temperature compensation apparatus as claimed in claim 12, wherein the fluid-filled gap is connected to a sealable filling device via a connection.
19. Temperature compensation apparatus as claimed in claim 15, wherein for the purpose of generating the circulation of the fluid, which fills the heat-distributing body designed as a hollow body, a recirculating device is connected to inlet and outlet openings of the heat-distributing body which are provided for this purpose.
20. Temperature compensation apparatus as claimed in claim 12, wherein at least one heat-distributing body is connected to one or more heat exchange elements of a temperature controller.
21. Temperature compensation apparatus as claimed in claim 20, wherein the heat exchange element is formed by a Peltier element.
22. Temperature compensation apparatus as claimed in claim 19, wherein a temperature controller of the flowing fluid is inserted into the circuit of this fluid.
23. Temperature compensation apparatus as claimed in claim 12, wherein at least one of the heat-

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distributing bodies is provided with a multiplicity of finger-type projections which are good thermal conductors and are aligned at least approximately perpendicular to the optical surface as antecedent basis.

24. Temperature compensation apparatus as claimed in claim 23, wherein the projections reach up to near the optical surface.
25. Microlithographic projection exposure objective, having at least one mirror support, wherein at least one mirror support is provided with a heat-distributing apparatus according to claims 1 to 24.

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